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ABSTRACT

This paper summarizes an extensive report on the development of a design using proven technology to demonstrate innovative and cost-effective means of using telecommunications in public service delivery. The conceptual approach of the study is briefly discussed. Seven "service packages," proposing uses of telecommunications in health, education and social service are described. The hardware and service costs, potential institutional constraints, cost benefit considerations, public policy issues, and possible implementation barriers are reviewed. Illustrative charts provide quick interpretation of the various proposals. (SK)

Abt Associates Inc.

55 Wheeler Street • Cambridge, Massachusetts 02138
Telephone 617-492-7100

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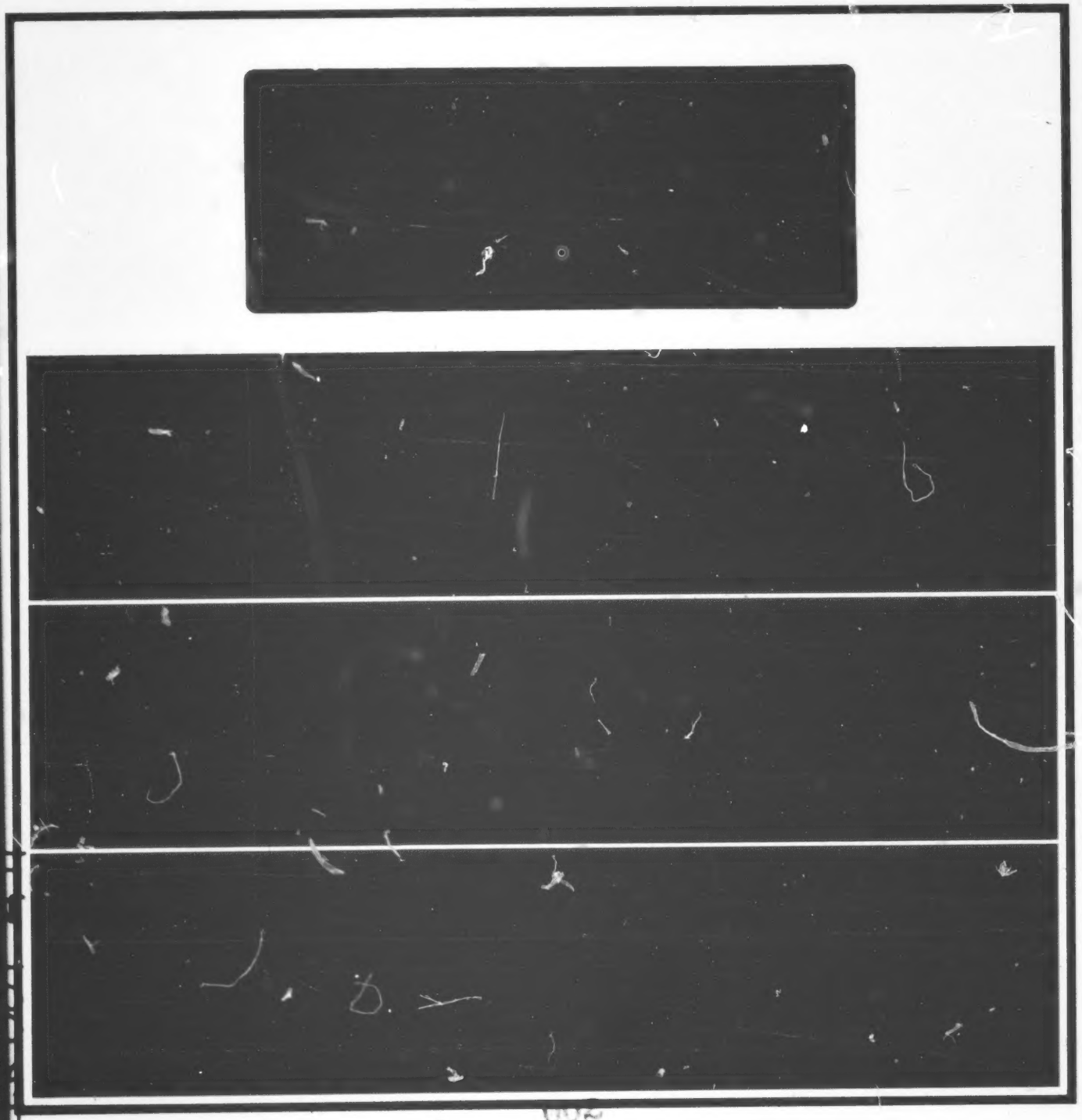

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ABT ASSOCIATES INC.
55 WHEELER STREET, CAMBRIDGE, MASSACHUSETTS 02138
TELEPHONE • AREA 617-492-7100
TELEX: 710-320-6367

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A Planning Study to Develop a Demonstration Design for the Use of Telecommunications in Public Service Delivery

EXECUTIVE SUMMARY
June 30, 1974

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Submitted to:

Office of Telecommunications Policy
Department of Health, Education and Welfare
North Building
Room 5524
330 Independence Avenue, S. W.
Washington, D.C. 20201

The Abt Associates team for this study included David MacFadyen, Area Manager, Technology Management Group; Samuel Carradine, Project Director; Dr. Roger B. Fransecky, Technical Director; Ralph Lee Smith, Senior Consultant; Deborah J. Blackwell, Deputy Project Director; and Robert F. Stone, Economist. Dr. Albert Horley is Director of the Office of Telecommunications Policy, HEW, the sponsors of the study, and Sherrill McMillon served as Project Officer.

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INTRODUCTION

Over the past several years, there have been many attempts by both Federal, state, and local governments, as well as by private foundations and other institutions, to describe and place into perspective the potential that telecommunications offers for increased public service delivery. To say the least, the results have been mixed. Several projects were funded as a result of various planning studies and many of these efforts have successfully demonstrated the utility of telecommunications technology in service delivery within their given context. Other projects have shown that due to institutional constraints, "human factors," or inappropriate technology utilization, telecommunications has been a less than satisfactory answer to the problem. In other words, planning studies and actual demonstrations have run the gamut from success to failure, and have examined the range of technological options. Thus, the status of further examination remains unclear. The National Science Foundation's recently funded studies of two-way interactive applications of telecommunications to social services have attempted to make the leap from generalized planning to actual comprehensive service

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delivery projects, and this is indeed a step to be commended. So too, the study that is reported herein is hopefully a stride in the direction of reality.

Part of the mandate of the Department of Health, Education, and Welfare, Office of Telecommunications Policy, was that Abt Associates develop a design using proven technology to demonstrate innovative and cost-effective means of service delivery. As a result our approach was to focus on the need and market for particular services, so as to avoid the perennial scenarios of "technological solutions in search of social problems". When looked at more carefully, many of the solutions were not as appropriate as first envisioned; however, the problems required very little search, for they have been and continue to be readily apparent. Lack of social services to the rural isolated and urban poor need not be documented, nor are the failures of the education and health care systems in this country especially elusive.

Too frequently, telecommunications is viewed not only as a panacea for the alleviation of social ills, but also as a means of unearthing service needs that had not been previously recognized. This is surely not the case. In fact, one of the hard truths that must be faced by telecommunications planners is the limitations of the technological applications that are being suggested. A corollary to this is that not all "traditional" service delivery mechanisms have failed. Often with

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additional resources, traditional service delivery mechanisms have proven to be extremely effective, precluding the need for increased technology and reaffirming the "human factor" aspect of service delivery.

Possible service needs and related target populations have been chosen on the basis of nationally recognized problems, as shown in government literature, priorities of social service agencies, and general public opinion. The Telecommunications User Advisory Committee, formed for this study, was composed of individuals with experience in social service delivery and telecommunications applications (see Appendix A). This group was extremely helpful in specifying target populations with prime needs which might be effectively met through telecommunications-based service delivery systems. The Committee also identified groups which now receive inadequate or no social services as the most important targets for the demonstration project, in particular specifying minority group members, non-English speakers, public assistance recipients, the elderly, the handicapped, the poor, and those who are socially and economically isolated from traditional social service delivery systems. It was felt that at present health, education, and social service providers lack financial and other incentives to provide comprehensive services so that innovative means are needed for sharing national resources with these groups.

With these caveats in mind, the telecommunications

services packages developed in this study were designed to address problems within the present service delivery environment, fully realizing the need to adapt current delivery modes in come instances and supplement these modes through telecommunications in others. The focus has been on those services that are most amenable to integrated delivery and at the same time, are capable of delivery through telecommunications in a cost-effective manner. While the services within the packages may not contain any surprises, the innovative aspect is the packaging itself, in which several services can be delivered using the same technology, thus enhancing the potential of integrated service delivery.

A final point is that this report is addressed primarily to the service planners and providers and has therefore attempted to take into consideration as much as possible their specific concerns and research needs. It is hoped that this document achieves two purposes: First, it should demonstrate strongly the feasibility, utility, and effectiveness of telecommunications in various service delivery contexts; and second, it should assist in planning demonstrations of such approaches, especially in terms of evaluating the impact of the projects and ascertaining whether they should be established on a widespread and on-going basis.

In addition to this Executive Summary, the full report consists of a volume in which detailed discussions of the issues

are presented. The sections in this summary correspond in large part to the major chapters of the main report.

CONCEPTUAL APPROACH

The conceptual approach for this study was relatively straightforward in that the underlying question that we have attempted to answer is: "What are the needs for specific social services, and in what ways can telecommunications technology be utilized to meet these needs?" The focus of this question should not be overlooked. We have structured our study around the need for a given service or set of services, how well these services integrate with each other, and then, we have examined the possible technologies available for use. We feel that this "needs/services" approach is more appropriate than the "feasible technology" approach because it tends to deal more directly with the problem at hand and one is not tempted to search for needs simply because there is a technology that appears to work and that might have some useful application.

A further aspect of our approach has been the manner in which we have obtained our information. While it was not possible to perform a comprehensive needs assessment, nor use primary data sources for information regarding current projects, we have placed strong emphasis on the views of the service providers and the service recipients. Adherence to this approach led to a study that is weighted heavily in terms of the services themselves as opposed to the technology, and this is altogether appropriate.

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The specific techniques employed in the determination of service needs consisted of a literature search of the projects utilizing telecommunications currently underway and those that have been conducted in the past, interviews with key people in the service delivery and telecommunications field, direct contact (by telephone) with several of the projects that were felt to prototypical of the types of applications possible, and the utilization of a Telecommunications Users Advisory Committee that was selected to represent the views of the service planner, the service provider, and the ultimate service recipient.

Examining specific projects currently in operation was done to achieve three goals: (1) To provide a detailed overview of the state of the art; (2) to isolate factors associated with successful and unsuccessful operations; and (3) to provide input for future site-specific planning.

The Telecommunications Users Advisory Committee's purpose was to generate input as to what services were needed and institutionally feasible in their environments. From the input of this Committee, we were able to provide both a broad interpretation of service needs and priorities and an identification of those aspects of current experiments that were crucial to the success or failure of the projects.

From this information, an initial list of potential service concepts was developed and criteria for service integration were applied to form clusters of services in the three areas of

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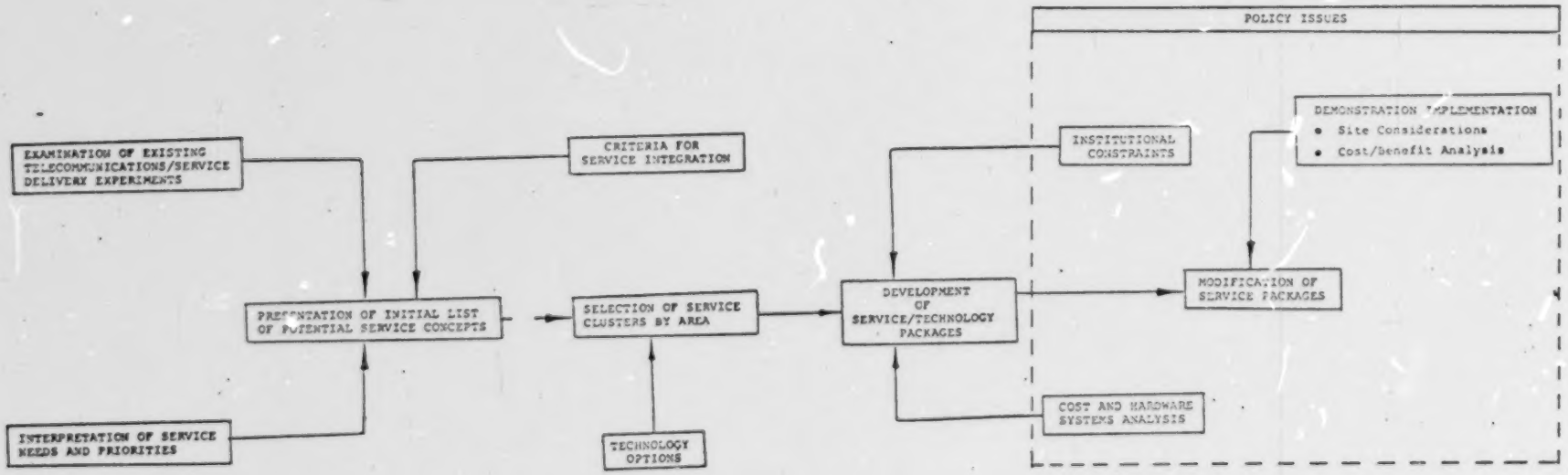
health, education, and other social services, and the technologies most appropriate for placing these clusters into service packages. Furthermore, the hardware and system costs, as well as the institutional constraints upon service packages were considered. Influencing the service packages throughout were actual demonstration considerations and policy issues such as privacy, community control, regulatory policy and payment structures.

The actual methodology employed for the study is illus- in Figure 1, and is discussed in greater detail in Chapter 2.0 of the main report.

A REVIEW OF CURRENT EXPERIMENTS

A review of current experimentation in adapting telecommunications technology to the fields of health, education, and social service delivery reveals a great diversity of program goals and objectives, target populations served and functions of the technologies. This is hardly surprising when we consider the many different ways telecommunication and information technology have been incorporated into the activities of everyday life. In the service delivery context, the technology has been utilized for resource-sharing between institutions, for professional interaction between service providers, for coordination of geographically separated institutions, to speed the flow of information between service

FIGURE 1


POLICY ISSUES
EXAMINATION OF EXISTING TELECOMMUNICATIONS/SERVICE DELIVERY EXPERIMENTS
CRITERIA FOR SERVICE INTEGRATION
INSTITUTIONAL CONSTRAINTS
DEMONSTRATION IMPLEMENTATION
• Site Considerations
• Cost/Benefit Analysis
PRESENTATION OF INITIAL LIST OF POTENTIAL SERVICE CONCEPTS
SELECTION OF SERVICE CLUSTERS BY AREA
DEVELOPMENT OF SERVICE/TECHNOLOGY PACKAGES
MODIFICATION OF SERVICE PACKAGES
INTERPRETATION OF SERVICE NEEDS AND PRIORITIES
TECHNOLOGY OPTIONS
COST AND HARDWARE SYSTEMS ANALYSIS

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providers and service recipients, to reduce transportation needs, to deliver new and innovative services, to individualize services received, to save costs in service delivery, and for resources of many institutions may be shared through telecommunications. In addition, the whole television medium changes from being a broadcast medium which caters to mass needs to being a "narrowcast" medium which may be responsive to local and individual concerns, and which is available for participation by community members.

In this study, the purpose of examining this wide range of telecommunications experiments was to identify service possibilities and to gain a preliminary idea of the feasibility of the services, based on past success or failure.

Some of the most sophisticated telecommunications service delivery systems, utilizing two-way video transmission, have been pioneered in the area of health care. Telemedicine systems have been developed to serve medical needs of all sorts: Consultation; diagnosis; therapy; medical education and continuing medical education for professionals, management of hospital activities, and public health. Most projects involve multiple services, either because the system was designed to deliver multiple services or because once the system was installed, new service uses evolved.

In examining the various telemedicine projects, certain characteristics seemed to be frequently present. First, is the

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experimental nature of the projects. These telemedicine projects were introduced by certain innovative persons in each medical institution, and these individuals faced the task of educating the health care providers in the use of the new technology. Second, resistance in the medical field to the new technologies comes fron the natural fear of change and also because the roles of the service providers are affected by the new systems. Third, cost has been found to be a barrier in many projects. The technology tends to be too expensive to be implemented without outside financial assistance. Finally, an issue which recurs in the telemedicine projects examined is the need for health providers to identify areas of need which could be met by telecommunications. Technological innovation must be responsive to a real need. The success or failure of telemedicine planners to gain this information from health care professionals will probably determine the success or failure of telemedicine.

In the area of education, many of the current telecommunications projects suggest that the role of the teacher may be substantially changed in the future through the use of the technology. First, computer management of routine tasks can free the teacher for more personalized instruction. Testing and grading may be delineated to the computer in the future, as well as routinized teaching tasks such as drill-and-practice sessions for which the computer may be easily programmed.

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Secondly, the role of the teacher may change into one of resource manager. Just as education increasingly consists of learning how to locate information, the teacher may become one who teaches how to locate and utilize educational resources.

Just as the advent of telecommunications technology in general has the potential for changing our concept of institutionalized meeting places, so the institutions of education could potentially change drastically in organizational structure through the implementation of educational telecommunications systems. The conventional classroom, or even the home, could become a resource center connecting the individual to a variety of people and resources throughout the country and the world.

The field of social service delivery through telecommunications is one which still remains largely to be explored. The largest group of what one might term social service applications to date has consisted of public interest programming on cable television, addressing issues of interest to groups within the community and offering information of general usefulness on services and community affairs. Another group of applications is geared toward management information systems and involves organizing of social service data for greater accessibility by service recipients. In addition, there are services for special groups within the community who are particularly in need of social service delivery or who are isolated from conventional delivery mechanisms.

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The experiments examined under this study suggest many services concepts and target populations. Particularly in a new field, it is most important to plan from the basis of whatever data is available on possible strengths and weaknesses of the type of service system being considered. In actual implementation of a service delivery system, it will be necessary to study in detail previous experiments containing as many relevant factors as can be determined. What this examination of current experimentation has shown is that successful telecommunications service delivery applications have been demonstrated in a wide variety of situations and have served an equally wide variety of needs. Of significant importance is the discovery that "human factors," such as professional and community acceptance and adjustment of work and life styles are often more critical to success than the sophistication or complete appropriateness of the telecommunications employed. Finally, no experiment is likely to succeed without a clear understanding of the needs associated with the services to be delivered and the establishment of clear objectives to meed these needs.

DEVELOPMENT OF INTEGRATED SERVICE PACKAGES

As stated in the introduction of this report, the overall purpose of the planning study was to explore ways in which communications technology may be used to enhance and extend delivery of public services and to create innovative and cost-effective means of service delivery. The results presented in

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this report comprise the basis for planning of a demonstration which integrates a number of alternative delivery systems with several public service concepts.

The service concepts themselves have been developed from several different sources. First, other relevant studies on telecommunications and service delivery were examined. The goal of this study has been to build upon the previous work in the field and to expand upon such areas as cost-benefit analysis of telecommunications-based service delivery systems, institutional constraints involved in implementing such systems, and policy issues, particularly the issue of privacy. For this reason, service concepts outlined in previous significant planning documents in the field were reviewed and incorporated.[1] A second source of ideas for service concepts was demonstrations which are now being carried on in the field, ranging from local community-based projects to major Federally-funded demonstrations.

Another input to the generation of service concepts was the areas of concern originally stated by the Department of Health, Education, and Welfare for the study. The stated purpose

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1. For example, see Testing the Applicability of Existing Telecommunication Technology in the Administration and Delivery of Social Services, Mitre Corp., April 12, 1973, and Communications Technology for Urban Improvement, Committee on Telecommunications, National Academy of Engineering, June, 1971.

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of the study was to:

> demonstrate appropriate roles for modern communications technology in providing needed community information services to and among individuals, more relevant communications between individuals and government, and more effective delivery systems for health, education and social services.

Service Integration. The underlying logic upon which integrated service delivery systems are based is that human beings are faced with a variety of problems, rather than "problem areas" which can be dealt with in isolation.[1] Therefore, a service delivery system which can solve client problems should be comprehensive, coordinated, and integrated. Particularly on a local level, multi-service programs have been found to be an effective method for meeting needs, because most human problems involve a complexity of factors rather than one categorical need. Integrated service delivery systems allow the service provider to respond to a problem on a number of different fronts. The objective of an integrated service delivery system is to offer, either directly or by referral, a range of services and activities to a given target population. Telecommunications-based service delivery systems may make a significant contribution to integrated service delivery because

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1. Comprehensive Neighborhood Programs: A Guidance Manual, p prepared by Abt Associates for the Office of Economic Opportunity, December, 1970, page 8.

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of their potential for extending communications between various agencies, institutions and personnel without regard to geographic separation, thus allowing these agencies to work more profitably together.

For telecommunications-based service delivery projects, integrated service delivery has a number of special benefits. First, implementation of telecommunications systems usually involves large start-up costs in capital expenditure for the hardware. A system which is planned to meet several service needs will have a broader base for economic support as well as for other types of support. Second, the nature of telecommunications technology itself is to enhance interaction and to make communication more efficient and quick. Linkages between institutions or individuals who have never before communicated become possible, and communications between institutions or individuals who already work together are facilitated. In this way, more resources are made available to the service recipients.

Criteria for Service Integration. The success of an integrated service delivery system will depend largely upon the care with which services are chosen for combination with one another. The two most general schemes for integration of services are integration based on client needs and integration based on system requirements. Planning of a client-oriented system involves identifying a suitable target population, listing all the possible needs of that group, and then designing

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a system responding to all these services needs. The potential problem of such a system is that services for one group become institutionalized, and duplicative service-systems develop. In planning a system-oriented service integration system, similar staff, space, and other support functions are matched to determine suitable services to integrate. Most viable service integration schemes will combine parts of both these orientations, achieving a balance between the two.

Four major criteria for service integration for telecommunications-based service delivery systems have been identified:

- Similar service users
- Corresponding program objectives
- Co-location of services
- Staff skills and function overlap

These criteria are sufficiently broad for general planning for service integration in the present study. In planning for a specific site, however, more detailed criteria must be developed to fit the particular mix of needs and systems in that location.

The purpose of identifying similar service users corresponds to the preceding discussion of client needs-oriented service integration. In site-specific planning, the suitability of certain integrated service systems for a particular site may be based upon demographic data and community needs assessment.

Corresponding program objectives serve as another criteria

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for integration of services. Services with common objectives will tend to produce results which are mutually reinforcing, thus achieving the aforementioned goal of enriching service delivery through results caused by the interaction of services. Achievement of certain service delivery goals will advance other goals. Programs may have corresponding objectives in that they aim to raise the standard of living of one particular client group, or in that they are aimed at solving a problem which crosscuts many groups.

Co-location of services is a systems-oriented approach to service integration. The classic example of integrated service delivery in the past has been the neighborhood-based service center.[1] The neighborhood service center is organized for maximum accessibility through close geographical location; the potential of telecommunications, however, alters the necessity of geographical proximity. Thus, the concepts underlying the neighborhood integrated service system may be transferred to a telecommunications-based system.

Staff skills and function overlap is the fourth criterion for service integration. Staff capabilities are an operational consideration which, as in co-location of services, will be im-

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1. Comprehensive Neighborhood Programs: A Model with Three Applications, prepared by Abt Associates for the Office of Opportunity, December, 1970.

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pacted by telecommunications links. For example, a neighborhood service center might determine services to be delivered on the basis of the multiple skills of a staff member. With telecommunications, however, on-site staff members may involve remote staff with a variety of additional skills in service delivery. Thus staff skill becomes much less of a limiting factor in the telecommunications system.

Application of Service Integration Criteria. The services examined in this study are classified based, in general, on concurrence on two or more of the criteria. In some cases, services with only one criterion in common are clustered because of the importance of that single link. While the distinction between health, education, and other social services is maintained, it should be remembered that the ultimate service packages suggested will cut across these service areas in several instances.

Figure 2 is a matrix of the health services/service integration criteria. Each cell entry indicates a fit between the spedified health service and a service integration criterion (note that the criteria have been broken up into sub-sets, thus allowing for multiple entries of a particular service for a given criteria). Figure 3 is a similar matrix for education while Figure 4 is the matrix for other social services. In examining the cell entries, it was possible to select clusters for each service area that fit similar criteria in similar ways. Figure 5 lists the resulting clusters by service areas.

Figure 2

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Health Service Integration Matrix

	Similar Service Users												Corresponding Program Objectives								Co-location of Services							Staff Skills and Functions Overlap								
	Rural populations	General community	Youth	Elderly	Handicapped	Other socially isolated	Health professionals	Health administrators	Patients	Public assistance recipients	Minorities		Public access and local origination	Career Advancement	Increased Community involvement	Improved Education Level	Improved "Quality of life"	Increased Availability of Information	Reduced Social Isolation	Improved community health standard	Hospitals	Nursing homes	Schools	Neighborhood centers	Prisons	Homes		Communications Technology	Court selling and Psychiatric Social Work	Knowledge of service agencies & resources	Health Education	Career information	Curriculum development & instruction	Primary care delivery	Citizen involvement & community development
1. Public health information to the community	•	•	•	•						•											•	•	•	•		•				•					
2. Teleconsultation		•		•																	•	•	•	•									•		
3. Nutrition information		•	•							•	•										•	•	•	•											
4. Prenatal and infant care		•			•																•	•	•	•											
5. Telemedicine applications using non-physicians		•				•															•	•	•	•											
6. Speech therapy via telecommunications																					•	•	•	•											
7. Testing of sight and hearing		•				•															•	•	•	•											
8. Videotape of rehabilitative process for treatment and records							•														•	•	•	•											
9. Patient monitoring							•	•													•	•	•	•											
10. Computerized patient history								•													•	•	•	•											
11. Computer data bank for medical information								•													•	•	•	•											
12. Video medical library								•													•	•	•	•											
13. Emergency medical network, involving fire, police, ambulances		•					•														•	•	•	•											
14. Teleconsultation to prisons																					•	•	•	•											
15. Patient visiting via telecommunications																					•	•	•	•											
16. Administrative staff interaction																					•	•	•	•											
17. Recording and transmitting of medical procedures for health students																					•	•	•	•											
18. Patient entertainment via telecommunications		•																			•	•	•	•											
19. Pharmacy services using telecommunications		•																			•	•	•	•											
20. Psychiatric remote diagnosis							•														•	•	•	•											
21. Teletherapy for mental patients								•													•	•	•	•											
22. Computerized total hospital activities								•													•	•	•	•											
23. Video grand rounds								•													•	•	•	•											
24. Seminars via telecommunications										•											•	•	•	•											
25. Patient education																					•	•	•	•											
26. Continuing education for medical professionals																					•	•	•	•											
27. Drug education			•																		•	•	•	•											
28. Videotapes for professional self assessment																					•	•	•	•											
29. Video display of minute surgical activities such as dental and opthalmic procedures																					•	•	•	•											
30. Recording of psychiatric interviews for later group diagnosis																					•	•	•	•											
31. CAI for medical education																					•	•	•	•											

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Figure 3

Education Service Integration Matrix

	Similar Service Users																Corresponding Program Objectives										Co-location of Services								Staff Skills and Functions Overlap									
	Rural populations	General community	Youth	Elderly	Handicapped	Other socially isolated	Health professionals	Health administrators	Parents	Public assistance recipients	Minorities	Public access and local origination	Career Advancement	Increased Community Involvement	Improved Education Level	Improved "Quality of life"	Increased Availability of Information	Reduced Social Isolation	Improved community health standard	Hospitals	Nursing homes	Schools	Neighborhood centers	Prisons	Homes	Communications Technology	Counseling and Psychiatric Social Work	Knowledge of service agencies & resources	Health Education	Career information	Curriculum development & instruction	Primary care delivery	Citizen involvement & community development
1. Adult education	•	•								•	•				•							•	•	•																
2. High school equivalency courses		•	•			•				•	•		•		•							•	•	•																
3. College course work offered in conjunction with particular universities	•	•				•																																			
4. Career education			•							•			•									•																			
5. Early childhood development		•												•								•	•	•																
6. Resource-sharing among schools			•																																					
7. Tutorial services			•												•							•																		
8. Open University			•	•	•										•							•																		
9. CAI for individualized instruction			•		•								•		•							•																		
10. Videotaping of children in educational setting for later viewing by parent and teacher																•																								
11. Education programs for drop-outs in community centers			•																																					
12. Courses for those confined to the home: housewives, handicapped, elderly				•	•	•									•																								
13. Programs for the non-English speaking											•																													
14. Student produced programs			•										•		•							•	•	•																
15. Classroom self paced learning			•											•								•	•																	
16. Library Resource Sharing																																								
	•	•																							•															

Figure 4

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Social Service Integration Matrix

	Similar Service Users												Corresponding Program Objectives								Co-location of Services								Staff Skills and Functions Overlap							
	Rural populations	General community	Youth	Elderly	Handicapped	Other socially isolated	Health professionals	Health administrators	Patients	Public assistance recipients	Minorities		Public access and local origination	Career Advancement	Increased Community Involvement	Improved Education Level	Improved "Quality of life"	Increased Availability of Information	Reduced Social Isolation	Improved community health standard	Hospitals	Nursing homes	Schools	Neighborhood centers	Prisons	Homes		Communications Technology	Counseling and Psychiatric Social Work	Knowledge of service agencies & resources	Health Education	Career information	Curriculum development & instruction	Primary care delivery	Citizen involvement & community development
1. Determination of eligibility	•	•								•																				•						
2. Repetitive learning for handicapped or retarded															•																					
3. Maintaining and updating records		•								•								•	•																	
4. Administrative coordination using telecommunications group conferencing																																				
5. Decentralized social service centers	•	•	•	•	•	•																		•												
6. Hotlines for referral and counseling		•	•	•		•												•						•												
7. Twenty-four hour service centers		•	•	•	•													•						•												
8. Crisis intervention			•	•						•	•																									
9. Client involvement in social service decision-making		•								•					•																					
10. Coordination of localities, states and regions for planning																		•																		
11. Social service information to general public		•																•																		
12. Reduced social isolation of the elderly				•															•																	
13. Social service information for the elderly				•															•																	
14. Rehabilitative services for the handicapped					•									•																						
15. Employment referrals and information			•		•						•			•																						
16. Counseling services		•																																		
17. Family planning		•																																		
18. Youth development and delinquency prevention			•																																	
19. Specific service referral from neighborhood centers		•	•												•								•													
20. Neighborhood information		•													•								•													
21. Centralized referral from home inquiry						•									•																					
22. Cultural access and expression			•			•									•																					
23. Public affairs information		•													•																					
24. Electronic town hall		•				•				•	•				•																					
25. Electronic Soapbox		•																																		
26. Citizen referenda		•													•																					
27. Video literacy workshops		•													•																					
28. Community video center		•													•																					
29. Community outreach		•	•	•	•	•					•																									
30. Information on rights and anti-discrimination procedures		•									•																									
31. Information dissemination to welfare recipients											•																									
32. Cultural programming for the handicapped					•	•																														
33. "Life Coping" skills					•	•																														
34. Vocation training		•			•	•					•																									

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Health Service Clusters

Cluster A	Cluster B	Cluster C	Cluster D	Cluster E	Cluster F	Cluster G
Public Health Information to the Community Nutrition Information Pharmacy Services Drug Education	Teleconsultation and Diagnosis Telemedicine Applications Using Non-Physicians Teleconsultation to Prisons Administration Staff Interaction Psychiatric Remote Diagnosis Teletherapy for Mental Patients Recording of Psychiatric Interviews for Later Group Diagnosis	Prenatal and Infant Care Speech Therapy Testing of Sight and Hearing Telemedicine Using Non Physicians	Videotape of Rehabilitative Process for Treatment and Records Recording and Transmitting of Medical Procedures for Health Students Video Grand Rounds Seminars Continuing Education for Medical Professionals Videotapes for Professional Self-Assessment Videotape Display of Minute Surgical Activities such as Dental and Opthalmic Procedures CAI for Medical Education	Patient Monitoring Patient Visiting Patient Entertainment Patient Education	Computerized Patient History Computerized Data Bank for Medical Information Video Medical Library Computerized Hospital Activities CAI for Medical Education	Emergency Medical Network

Education Service Clusters

Cluster A	Cluster B	Cluster C	Cluster D	Cluster E		
Adult Education Career Education Courses for Those Confined to the home	High School Equivalency Courses Career Education Tutorial Services Education Programs for Drop Outs in Community Centers Education Programs for the Non-English Speaking	College Course Work Offered in Conjunction with Universities Tutorial Services Open University CAI for Individualized Instructions Classroom Self Paced Learning Student Produced Programming	Early Childhood Development Videotape of Children in Education Setting for Later Viewing by Parent and Teacher Student Produced Programming	Resource-Sharing Among Schools Resource-Sharing Among Libraries		

Social Service Clusters

Cluster A	Cluster B	Cluster C	Cluster D	Cluster E	Cluster F	
Determination of Service Eligibility Maintaining and Updating Records Decentralized Social Service Centers Regional Coordination of Social Service Agencies Administrative Coordination Using Telecommunication Group Conferencing Client Involvement in Social Service Decision Making	Repetitive Learning for Handicapped or Retarded Reduced Social Isolation of the Elderly Rehabilitative Services for the Handicapped Family Planning Cultural Programming for the Handicapped "Life Coping" Skills	Social Service Information to General Public Social Service Information for the Elderly Employment Referrals and Information Neighborhood Information Public Affairs Information Information on Rights and Anti-discrimination procedures Information Dissemination to Welfare Recipients	Youth Development and Delinquency Prevention Family Planning Counseling Services Community Outreach Vocational Training "Life Coping" Skills	Specific Service Referral from Neighborhood Centers Hot Lines for Referrals and Counseling Twenty-Four Hour Service Centers Crisis Intervention Employment Referrals and Information Centralized Referral from Home Inquiry Community Outreach	Cultural Access and Expression Public Affairs Information Electronic Town Hall Electronic Soapbox Citizen Referenda Video Literacy Workshop Community Video Center Client Involvement in Social Service Decision Making	

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Figure 5

Telecommunications Technology and Service Cluster Linkages. A key step in the development of service packages is the linking of the service clusters with the technological options available. Figures 6, 7 and 8 present technology matrices for the areas of health, education, and other social services respectively.

A closer look at the cell entries in the above figures gives some idea of the potential for each of the technologies to provide the services in the given clusters. It is readily apparent that videotape is an appropriate technology for one-way dissemination of general information that can be used over and over again. This is true for hospitals, schools, and neighborhood centers. Another technology that has an application across service areas is the telephone, either in conjunction with a computerized referral network, or for providing audio or digital upstream information in a one-way CATV system.

The next step in the development of the "packages" is to eliminate those services/technology combinations that are not best suited for the delivery of the service and to combine those combinations that are both highly suited to delivery and allow optimal flexibility in delivering other clusters of services, through adaption of other telecommunications hardware.

PROPOSED SERVICE/TECHNOLOGY PACKAGES

The service/technology packages presented on the following pages have been developed in accordance with the criteria for

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Figure 6

Telecommunications Technology/ Health Clusters

	Videotape	Telephone	Radio Broadcast	Television Broadcast	Closed Circuit TV	One-Way CATV	One-Way CATV with Telephone	Two-Way CATV with Digital Response	Two-Way CATV with Audio Response	Two Way CATV with Full Video	Computers	Facsimile Transmission
A. Public Health Information	●	●	●	●		●						
Nutrition Information	●	●	●	●		●						
Pharmacy Services		●			●		●		●			
Drug Education	●	●	●	●		●						
B. Teleconsultation and Diagnosis					●		●		●	●		
Telemedicine Applications Using Non-Physicians		●			●		●		●	●		
Teleconsultation to Prisons					●		●		●	●		
Administrative Staff Interaction		●			●		●	●	●	●		●
Psychiatric Remote Diagnosis		●			●							
Teletherapy for Mental Patients		●			●							
Recording of Psychiatric Interviews for Later Group Diagnosis	●											
C. Prenatal and Infant Care		●			●		●		●	●		
Speech Therapy					●				●	●		
Testing of Sight and Hearing					●	●	●		●	●		
Telemedicine Using Non-Physicians		●					●		●	●		
D. Videotape of Rehabilitation Process for Treatment and Records	●											
Recording of Medical Procedures for Health Students	●										●	
Video Grand Rounds						●	●		●	●		
Seminars				●	●	●			●			
Continuing Education for Medical Professionals							●					
Videotapes for Professional Self-Assessment												
Video Displays of Minute Surgical Activities such as Dental and Opthalmic Procedures					●	●			●	●		
CAI for Medical Education											●	
E. Patient Monitoring					●	●						
Patient Visiting		●			●		●		●	●		
Patient Entertainment	●		●	●	●	●						
Patient Education	●		●	●	●	●						
F. Computerized Patient History											●	
Computerized Data Bank for Medical Information											●	
Video Medical Library	●										●	
Computerized Hospital Activities											●	
CAI for Medical Education											●	
G. Emergency Medical Network		●					●		●	●		

Figure 7

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Telecommunications Technology/ Education Clusters

	Videotape	Telephone	Radio Broadcast	TV Broadcast	Closed Circuit TV	One-Way CATV	One-Way CATV with Telephone	Two-Way CATV with Digital Response	Two-Way CATV with Audio Response	Two-Way CATV with Full Video	Computers	Facsimile Transmission
A. ● Adult Education	●		●	●	●	●	●	●				
● Career Education	●		●	●	●	●						
● Courses for Those Confined to the Home				●		●	●	●	●			
B. ● High School Equivalency Courses				●	●	●						
● Career Education	●		●	●	●	●	●					
● Tutorial Services	●	●					●	●	●		●	
● Educational Programs for Drop Outs in Community Centers	●				●	●			●	●		
● Educational Programs for the Non-English Speaking				●	●	●			●	●		
C. ● College Course Work with Linkage of Universities				●		●				●		
● Tutorial Services	●	●					●	●	●		●	
● Open University	●					●	●	●	●	●	●	●
● CAI for Individual Instruction								●			●	
● Classroom Self-Paced Learning	●				●						●	
● Student Produced Programs	●				●	●						
B. ● Early Childhood Development	●				●					●		
● Videotape of Children in Educational Setting for Later Viewing by Parent and Teacher												
● Student Produced Programming					●	●						
E. ● Resource-Sharing Among Schools	●	●								●	●	●
● Resource-Sharing Among Libraries	●	●								●	●	●

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Figure 8

Telecommunications Technology / Social Service Clusters

		Videotape	Telephone	Radio Broadcast	Television Broadcast	Close Circuit TV	One-Way CATV	One-Way CATV with Telephone	Two-Way CATV with Digital Response	Two-Way CATV with Audio Response	Two-Way CATV with Full Video	Computer	Facsimile Transmission
A.	Determination of Service Availability		●									●	
	Maintaining and Updating Records											● ●	
	Coordination of Social Service Agencies		●									●	
	Administrative Coordination Using Telecommunications for Group Conferencing		●					●		●	●	●	●
	Client Involvement in Social Service Decision-Making							●	●	●	●		
B.	Repetitive Learning for Handicapped or Retarded	●					●		●	●	●		
	Reduced Social Isolation of the Elderly	●	●	●	●		●				● ●		
	Rehabilitative Services for the Handicapped	●				●			●		●		
	Family Planning	●			●	●	●						
	Cultural Access and Expression	●		●	●		●	●					
	Cultural Programming for the Handicapped	●			●		●	●					
	"Life-Coping" Skills	●			●		●	●		●			
C.	Social Service Information to General Public	●	●	●	●		●	●					
	Social Service Information for the Elderly	●	●	●	●		●	●					
	Employment Referrals and Information		●		●		●	●					
	Neighborhood Information	●	●	●	●		●	●					
	Public Affairs Information		●	●	●		●	●					
	Information on Rights and Anti-Discrimination Procedures		●	●	●		●	●					
	Information Dissemination to Welfare Recipients		●	●	●		●	●					
D.	Youth Development and Delinquency Prevention							●		●	●		
	Family Planning	●			●	●	●						
	Counseling Services		●							●	●		
	Community Outreach			●	●		●						
	Vocational Training	●			●		●				●		
	"Life-Coping" Skills	●			●		●	●		●			
E.	Specific Service Referrals from Neighborhood Centers		●					●		●	●		
	Hotlines for Referrals and Counseling		●							●	●		
	24 Hour Service Center		●					●		●	●		
	Crisis Intervention		●					●		●	●		
	Centralized Referral from Home Inquiry		●										
	Community Outreach			●	●		●						
F.	Cultural Access and Expression	●		●	●		●	●					
	Public Affairs Information		●	●	●		●	●					
	Electronic Town Hall							●		●	●		
	Electronic Soapbox						●			●	●		
	Citizen Referenda							●	●	●	●		
	Video Literacy Workshops	●					●						
	Community Video Center	●					●						
	Client Involvement in Social Service Decision-Making							●	●	●	●		

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service integration previously discussed. The seven packages are also all responsive to the following three considerations:

- The need for demonstration of the service/technology mix
- The ability of the package to provide a variety of services using one or two compatible technologies
- The extent to which the service packages are flexible and may be expanded in a modular fashion

Service Package A: Hospital Services Using Videotape and Computers. This service package may be instituted within a single hospital or medical center, although the computer data might be transferred to another outlying health facility. The services to be delivered basically involve recording and organizing of medical data through the use of videotape and computers. The following services, which include parts of various health and social service clusters, may be delivered through such a system.

- Recording of psychiatric interviews for later group diagnosis
- Videotape of rehabilitative process for treatment and records
- Recording of medical procedures for health students
- CAI in medical education
- Computerized patient history
- Computerized data bank for medical information

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- Video medical library
- Computerized hospital activities
- Public health information
- Nutrition information
- Drug education
- Rehabilitative services for the handicapped
- Family planning
- Determination of (health) service availability
- Coordination of (health) agencies

Service Package B: Service Referral Computer Data Bank With Telephone Access. A centralized source of referrals to services may be demonstrated as a service/technology package in itself or as a component of other service networks. These services could be delivered through a data bank accessed by community members via telephone:

- Determination of service availability
- Maintaining and updating records
- Coordination of social service agencies
- Social service information to the general public
- Employment referrals and information
- Neighborhood information
- Public affairs information
- Information on rights and anti-discrimination procedures

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- Information to welfare recipients
- Hotlines for referral and counseling
- 24-hour service centers
- Crisis intervention
- Centralized referral from home inquiry
- Public health information
- Nutrition information
- Pharmacy services
- Drug education

Service Package C: Community Involvement Project Using One-Way Cable Television. In this service/technology package, the concept of the community video center is expanded to include greater dissemination of programming through a community cable television center. The community cable television project is based upon the idea that television may be used as a medium for community members to express and exchange ideas. A community center with equipment and technical assistance available to community members to produce their own programming and a channel or channels reserved for this public access programming are the necessary components of this community involvement service/technology package. The following services may be delivered:

- Cultural access and expression
- Public affairs information

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- Electronic soap box
- Video literacy workshops
- Community video center
- Community outreach
- "Life-coping" skills
- Neighborhood information
- Reduce the social isolation of the elderly
- Cultural programming for and by the handicapped
- Student-produced programming

Service Package D: Educational Services Delivered Through One-Way Cable Television with Call-Back Capacity. Cable links to institutions such as industrial sites, nursing homes, prisons, hospitals, neighborhood centers, and homes enable individuals to receive instruction without having to travel to a centralized educational facility. Telephones may be used to provide a student capability for question-asking. The cheif advantage of this service/technology package is that it increases the accessibility of education, thus allowing adults and non-traditional students to receive instruction. The followint services are possible in this service/technology package:

- Adult education
- Courses for those confined to the home
- Open University
- Continuing medical education
- Careet education

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Although the list of services is short, each service listed here addresses a range of possible subject matter and a large target population. Therefore, these services have been considered adequate in themselves to constitute a service package.

The logical technological extension of this service/technology package is full two-way video transmission between institutions previously linked with one-way cable and telephone call-back.

Service Technology Package E: Innovative Classroom Education with Computer and Closed-Circuit Television. Increased awareness of the special needs of each student in a traditional classroom setting makes a service/technology package such as this one valuable to educators. Computers may be used to free the teacher from routinized tasks and to provide individually-paced learning for each student. Closed-circuit television is used to increase the resources available to the classroom teacher. The following services may be delivered in the classroom using these technologies:

- Classroom self-paced learning
- Computer-assisted instructions
- Student-produced programs
- Resource-sharing among schools
- Resource-sharing among libraries
- Career education
- Educational programs for the non-English speaking

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Once programming is developed to deliver these services, it may be widely employed by many schools. Programs may be distributed by mail to a number of schools, or, it the schools are linked through telecommunications at a later date, may be transmitted by cable. Libraries may also develop programming to be shown within schools. High quality software forms the basis for success of this service/technology package.

Service package F: Interactive Television for Education and Social Service Delivery in the Home. Interactive television refers here to a system in which the viewer receives video programming, or slide programming using a frame-grabber and has a digital response capability. This technological system constitutes the most sophisticated television system which may now be implemented in the home, due to bandwidth constraints. If a home viewer has full two-way video capability, one channel of spectrum space is required. Even in a system with 25 to 40 channels, the bandwidth is inadequate to support this two-way video service to an entire community. Frame-grabbing is a method whereby many viewers may share one channel, and hence it is most appropriate for home use.

The interactive capability basically gives the viewer the opportunity to make requests and to control the direction of the program through his or her responses. The viewer also has the opportunity to express opinions through the electronic

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polling capability. The following services are suitable for delivery in this mode.

- Adult education
- Courses for those confined to the home
- Tutorial services
- CAI for individual instruction
- Open university
- Client involvement in social service decision-making
- Repetitive learning for the handicapped or retarded
- Rehabilitative services for the handicapped
- Citizen referenda

As in service/technology Package E, development of high-quality software is crucial to the success of such services. Collaboration between curriculum developers, television programmers, and computer programmers is necessary to insure that balanced, useful programs are developed. This service/technology package will be particularly valuable to home-confined groups such as housewives, the elderly, and the handicapped.

Service Package G: Two-Way Institutional Network for Communication and Resource-Sharing. A point-to-point network connecting major service delivery institutions is the most suitable application for two-way video transmission. A number of previous experiments have connected pairs of institutions in this way, and the more the network is expanded to include dif-

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ferent types of service institutions, the more possibilities for integrated service delivery systems will arise. The following services can be delivered over such a system:

- Telemedicine applications using non-physicians
- Teleconsultation and telediagnosis
- Teleconsultation to prisons
- Administrative staff interaction
- Pharmacy services
- Prenatal and infant care
- Speech therapy
- Testing of sight and hearing
- Video grand rounds
- Video displays of minute surgical procedures such as dental and opthalmic procedures
- Patient visiting
- Emergency medical network
- College course work with linkage of universities
- Resource-sharing between schools
- Resource-sharing between libraries
- Reduce social isolation of the elderly
- Rehabilitative services for the handicapped
- Counseling
- Vocational training
- Specific service referrals from neighborhood centers
- 24-hour service center

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- Crisis intervention
- Electronic town hall
- Electronic soap box

Inclusions of various types of service institutions will suggest services beyond this list as well. This service/technology package is extremely comprehensive, and previously-suggested service/technology packages could function as one component of this city-wide or regional network of service institutions. The possible institutions in such a network include major medical centers, neighborhood health clinics, nursing homes, health professions, schools, universities, prisons, libraries, social service agencies, and others to be determined on the basis of specific sites.

COST AND HARDWARE SYSTEMS

We will not attempt to go into detail in terms of hardware and costs in this summary. A detailed analysis, including costs can be found in the main report. However, there are some points that should be made.

A large number of experiments or demonstrations are presently in existence, in schools, hospitals, social service agencies, and community centers around the nation. Many of these have been carefully conceived, well designed, and efficiently executed; some have not. But in the aggregate they have shown clearly the potential for telecommunications in generating new services and in reducing the cost of more traditional ones. These experiments

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have been performed with diverse equipment, under diverse conditions, and under diverse managements; in many cases they have been patched on to existing programs or existing telecommunications facilities.

It would appear that the need exists to standardize some of the more successful experiments in a way which would permit comparisons among them on the basis of cost and effectiveness, and replication of the surviving ones nationwide. In addition, it appears likely that economies of scale could be achieved by integrating a number of such experiments into a single demonstration system, allowing them to share common facilities and a common management.

The major systems examined in this study included videotape and teleprocessing systems using one-way and two-way CATV and computers with dial access.

In addition to the description of the hardware involved in the systems, the study examined briefly the incidence of costs, system capabilities, subscriber penetration, rate of return, and maintenance allowances.

What became most obvious is that assembling a working system is much more complex than simply ordering the parts and components checked and plugging them together. While the approach of linear addition of components employed in this study is useful for costing purposes, it ignores necessary equipment and expenses for subsystem interfacing, system integration, etc. Inclusion of all of these in detail would be necessary for specific system design in demonstration sites.

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INSTITUTIONAL RELATIONSHIPS AND CONSTRAINTS[1]

In examining the institutional relationships involved in the introduction of integrated service delivery through telecommunications technology, one must first look at the institutional resistance to such an introduction. That is, what resistance will new service delivery modes encounter from existing institutions and institutional personnel? On the other hand, one must also look at the nature of institutional acceptance (passive) or institutional change (dynamic), where the institutions feel that the application of telecommunications enhances their overall effectiveness and thus becomes a stimulus for institutional development and growth.

Potential of institutional cooperation has been considered in developing the demonstration design and subsequent service packages. Too often, opportunities for cooperative interaction between institutions and possibilities of networking and sharing of costs and resources are overlooked through too heavy a focus in the planning phase on overcoming anticipated institutional resistance that never materializes.

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[1]Many of the institutional constraints and considerations presented herein are based on two meetings of a Telecommunications User Advisory Committee (TUAC). This committee was created and convened by an Abt Associates subcontractor, Public Technology, Incorporated, to identify in general terms those social services that should be considered for experimental delivery. The TUAC also discussed several concerns and constraints, regarding this method of social service delivery, which affects institutions, their clients, and the general population. Committee membership included medical personnel, social service administrators, social service planners, computer and telecommunications experts, educators, minority representatives, and local government administrators. (See Appendix A for a listing of participants on the Committee).

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However, there are several general institutional constraints that would be encountered in establishing and implementing a demonstration, regardless of whether the demonstration focuses on aspects of health, education, or other social services. These constraints can be broadly categorized into six overlapping areas of consideration. These areas are:

- organizational considerations;
- territorial considerations;
- personnel considerations;
- information considerations;
- economic considerations; and
- service product considerations.

Organizational considerations relate to institutional acceptance of new service delivery modes. Territorial considerations involve concerns of new individuals and new areas of skills replacing or working in conjunction with traditional service delivery types. This would be especially true in rural areas where the influx of new telecommunications service delivery will invariably imply new and different faces living in these areas. Personnel considerations are more directly manifested in unions and other trade associations. Furthermore, the professionals involved in service deliveyr in the traditional way are not immune to concern with rapid technological change. Lack of complete understanding of the new telecommunications applications, a feeling that their skills may not be readily transferrable, and a need to learn new management techniques to meet the needs of the new technology and new personnel may cause the professionals in some cases to impose barriers to the demonstration.

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Information considerations deal primarily with the need to establish adequate "protocols" to be employed in using the new system of service delivery. Such protocols would have to take into consideration the question of "communications etiquette" that would have long been established in the institutions. Economic considerations range from the problem of restructuring wage scales to correspond to the redefinition of job roles and responsibilities that would result from the telecommunications service delivery system to the problem of "copyright" or residual payment of stored software material.

Service product considerations raise several important issues of potential institutional constraints. The most widespread is the issue of accreditation of certain personnel in the delivery of the services. What is involved, particularly in the health field, is the transition of critical functions and the way in which both institutions and service recipients will respond to and participate in this transition.

Aside from the basic institutional constraints discussed above, there will be various jurisdictional, legal and regulatory constraints imposed on the HEW telecommunications experiments. Obviously a major set will be those imposed by the Federal Communications Commission (FCC). The FCC rules affect broadband cable television, telephone, and over-the-air broadcast transmissions. Therefore, the cooperation of this federal agency will be a basic requirement.

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IMPLEMENTATION OF DEMONSTRATIONS

A major barrier to effective planning studies is the lack of appropriate or site-specific information from which to develop workable programs. Therefore, the following items are suggested as essential to any meaningful follow-on study of telecommunications for social service delivery which aims toward the possibility for a demonstration, in approximately the order given:

- A clear definition of the target area (including geographic size, demographics, existing telecommunications systems, etc.);
- A clearly defined service need assessment for the area (compiled primarily by social service delivery personnel, not technical personnel);
- Selection of the service package (s) appropriate to fill the specified needs;
- A detailed engineering specification of the telecommunications system(s) required to implement the service package (s);
- A detailed cost/benefit analysis of demonstration impact.

Furthermore, the particular service packages, target populations, and geographic locations chosen for the future telecommunications demonstration projects will in many ways determine the success of the projects and the likelihood that they will catalyze further change. It is therefore critical that a means be developed through which wise demonstration choices can be made. The initial phase of the decision process would examine

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more detailed data on each of the potential packages, and choose among them based upon the preferences of the policy-maker as well as upon a more detailed relative evaluation of the packages themselves against specific site criteria.

Perhaps the most important and most difficult criterion to apply to the choice of service packages for demonstration is the criterion that the service be one for which a significant need exists. The criterion that the packages of services selected for the future demonstrations be economically efficient is conceptually clear, but difficult to apply, given difficulties in estimating costs and benefits of potential projects. In particular, the question is not so much whether a new service can be provided to meet an unmet need as whether the existing service can be provided more efficiently in that site. Social, political, and legal constraints provide a rich field for consideration, as various groups within a site will have diverse attitudes toward what comprise relevant social and political constraints. Legal constraints will be more clear-cut; however, it may be expected that some changes will ensure due to the impact of telecommunications in this field Social and political constraints will deal with issues such as the attitude of the service recipients to the delivery system.

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The fact that our cost/benefit analysis will be performed in order to determine optimal demonstration packages may require modification of our cost/benefit methodology presented in Chapter 8.0 of the main report in three distinct ways.

First, insofar as a demonstration, as opposed to long-range service delivery, may involve special payments mechanisms and special actors and actor relationships, it is critical to identify who, in the long run, is expected to pay for the telecommunications system and who is expected to benefit from the telecommunications system. The reason is that, if the parties who pay and the parties who benefit are different, then it is quite possible that the "payees" may, in fact, have no incentive to pay.

For example, a municipality that is interested in providing the present level of services at minimum cost may not find the additional benefit from citizen's time saved to be a persuasive argument in favor of telecommunications delivery unless the new system also reduces the total cost of service. Similarly, the external benefits of reducing congestion by cable deliveyr of university courses will not be considered by the university administrator in deciding whether to employ the cable system.

Second, it is probable that demonstration delivery will not entirely replace conventional service delivery. Many families, not involved in the demonstration, will require

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conventional service delivery. In these cases, benefits from the new system must be compared with the costs of both the new and the old systems. For example, if facsimile mail service existed for a portion of the mail market and conventional mail service existed for the remainder of the market, the cost of serving the market using the new system must be compared with what it would cost to serve that portion by conventional means. (The total cost of the new system would have to be less than the additional variable cost of serving the new market by conventional delivery.)

A third and final point is that, for this demonstration, the cost-benefit analysis may not be able to estimate benefits over the life of the system or the life of the service, but rather, the analysis may extend only through the life of the demonstration. Thus, as well as providing high returns, the service packages must, during the demonstration life span, demonstrate some level of cost-effectiveness.

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POLICY ISSUES

Several policy issues are important to consider at this juncture in terms of developing telecommunications demonstrations. Of prime importance is the issue of privacy that has so frequently been referred to in this report. A related issue is that of community control. A third policy issue is regulatory behavior, and a final major policy consideration is payment for services. Each of these is important in that governmental behavior on the legislative, judicial, or regulatory front will have grave impact on the scope and nature of service delivery via telecommunications.

Privacy

Throughout this study, concern has been expressed with regard to the potential for loss of privacy and violation of civil liberties implicit in many telecommunications applications. Particularly in areas where centralized personal files are suggested to facilitate service delivery, the potential for unauthorized access to records in large. Furthermore, the increased utilization of two-way CATV in the home (should it be facilitated by one of the demonstrations) provides another communications link that is capable of being intercepted or "eavesdropped" on for improper purposes.

Certain obvious precautions must be taken in the compiling of computerized information on individuals. Access to the information must be strictly controlled -- although it seems unlikely that any municipality will deny access to

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individual records by a Federal government that seeks it in the name of "national security." It has also been suggested that individuals should have access to their own computerized personal data and should have a right to challenge the contents. Formidable problems nevertheless remain to be dealt with through legislation and through civic vigilance as the technology comes into increasing use.

In terms of two-way CATV message interception, the answer probably lies in more stringent laws against invasion of privacy in general, with specific reference to the new problems brought about by cable technology. In addition, scrambling devices and other technological safeguards can be required as part of systems in which the possibility of such misuse is a strong possibility.

Community Control

An additional safeguard against invasion of privacy is that the control of the system be in the hands of the user -- i.e., community control. Community control is not a new issue, but both the potential usefulness of telecommunications technology in providing new and improved services to the community and the potential dangers inherent in the encroachment of such technology upon the unaware make the issue of system control a very sensitive one. Local communities, particularly minority communities, had have little access to the media; and cable and other new telecommunications technologies might serve as a vehicle through which the views

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of these communities are expressed. However, for this to occur, adequate access must be made available. The only sure way that such access will be available is for the communities to exercise a strong voice in the governance of the communications systems in their areas. Whether this will occur or not in the near future is a question of serious debate. The local policy review board suggested in Chapter 6.0 may be the type of group that could leverage adequate community power to achieve some degree of influence in the determination of policy.

Federal Regulatory Policy

Federal regulatory policy toward telecommunications has only marginally focused upon social service delivery via telecommunications. Instead, the overriding bulk of regulatory policy has been devoted to the competitive struggle between over-the-air television and CATV for the rights to the television entertainment medium (educational and local origination program requirements not withstanding). In a real sense, however, the struggle of CATV, and the regulatory posture which has limited its present penetration, have crucial implications for the development of telecommunications-based social-service deivery system. For the most part, any large-scale scheme of telecommunications social service delivery is dependent upon a pervasive cable mandate with a concomitant large-scale penetration rate. So long as FCC regulatory policy effectively prohibits cable from entering primary U.S. markets and

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consequently limits total cable penetration to under 15% the entertainment-established base of potential telecommunications-delivered social service users will remain too small to justify the formidable hardware expense of wiring a community. Unless Federal cable policy becomes more supportive of CATV and less protective of commercial over-the-air interests, we predict that social service delivery via telecommunications will be constrained to demonstrations at a few CATV sites and to limited point-to-point institutional linkages.

The previous conclusions, however, are not necessarily critical of present (relatively restrictive) regulatory policies regarding CATV. Whether the large-scale development of CATV is warranted, either as an entertainment medium or as a social service medium or both, is a highly complex issue well beyond the capabilities of this study to attempt to deal with. More importantly, Federal regulatory policy towards CATV does not inhibit other telecommunications technologies such as videocassette and telephone-based systems. In a sense, regulatory constraints on CATV might be interpreted as residual support for these alternative telecommunications technologies. In any event, regulatory issues will shape, to a large extent, whether telecommunications in general will have wide spread applications in service delivery, and if so, which specific telecommunications technologies will be likely to be utilized for such purposes.

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Payment for Services

Critical in all the future telecommunications experiments is the issue of paying for the services in an on-going, viable manner. The key to payment will be perceived value on the part of the user, and cost-benefit improvements on the part of the service provider. Where broadband, television signals are used to provide the service, one will have to change the attitudes regarding television receivers. For a user in the general population to consider paying for certain services delivered by CATV, that person must view the receiver as more than just an entertainment medium. One might adopt selective or marketing practices to sell certain social services delivery. Such practices would seek to increase the overall market for CATV by adding on select audiences, where the profit is a marginal or increment contribution to the whole.

However, certain social services can only be paid out of general tax funds collected at the federal, state or local level. Under the present circumstances of tight budgets and resistance to increased taxation, payment will amount to a re-allocation of public sector resources. For such reallocation to occur, the service provider must perceive a clear benefit in either costs or benefits, while the user must be willing to accept the changes. Here the role of a local policy review board will be critical. This board must assure that the new services are what the service

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clients want and can accept. Furthermore, where service users have an opportunity to influence the way public funds are spent on social service delivery, change in the overall system of delivery will be made possible.

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Appendix A

Telecommunications Users Advisory Committee

Mr. Rodney Alexander
Mt. Sinai School of Medicine
Section on Communications
New York, New York

Dr. Kenneth Bird
Massachusetts General Hospital
Boston, Massachusetts

Dr. Donald Bitzer
Director of Computer Based Educational
Research Laboratory
University of Illinois
Urbana, Illinois

Ms. Dolores Delahanty
Director of Human Services Coordination
Project
Louisville, Kentucky

Mr. Carl Husby
Finance Director
City of Sunnyvale
Sunnyvale, California

Dr. Levi Lathan
Director of Curriculum Planning and
Media Services
Illinois State Government
Springfield, Illinois

Mr. Daniel Leahy
Vice President
Public Telecommunications Corporation
Boston, Massachusetts

Dr. Fred Lundberg
Director, Information Systems Center
Cincinnati, Ohio

Dr. Helen Matthews
Director, United Board for College
Development
Atlanta, Georgia

Mr. David Ochoa
Director of Bi-Lingual Children's
Television Workshop
KNBC
Burbank, California

Mr. Harold Pyke
Operational Director, Interact
Dartmouth Medical School
Hanover, New Hampshire

Mr. Glen Ralston
Department of City Planning
New York, New York

Dr. Arthur Thomas
Director of Bolinga Black Cultural
Resources Center
Wright State University
Dayton, Ohio

Mr. Paul Weber
Director, Lane County Data Processing
Center
Eugene, Oregon

Mr. Chester Yazzie
General Manager, Navajo Report
KOAI-TV
Flagstaff, Arizona

Mr. Thomas Hargadon
Mayor's Office
Boston, Massachusetts